

*Results of***Researchers' HPC, Storage and Staff Needs 2015-2020**

The purpose of this survey is to gather input from researchers on their projected needs in the following areas for the period 2015 to 2020:

- 1) High performance computing (HPC)
- 2) Storage
- 3) HPC support staff

This input will be used in 2020 Vision: The NJIT Strategic Planning Initiative (2015-2020).

About the participants:

24 out of 41 invitees participated in the survey. Of these, 23 identified as **faculty**, and 1 identified as **research professor**.

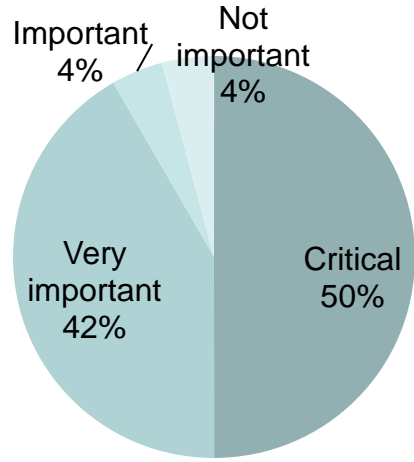
All participants reported using, or planning to use in the next 5 years, NJIT's centralized computing resources.

Importance of NJIT's centralized computing resources

Q1: How important to your research are NJIT's centralized computing resources?

CHOICES	#RESPONSES
Critical	12
Very important	10
Important	1
Not important	1
Uncertain	0

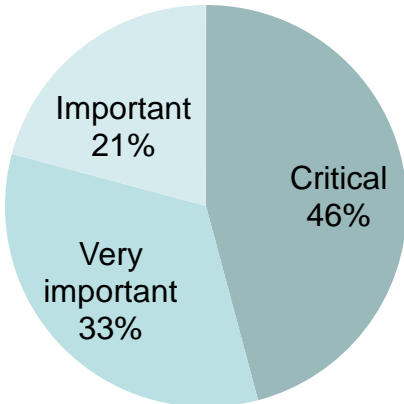
Importance to research of centralized computing resources



Q2: How important to your obtaining research funding are NJIT's centralized computing resources?

CHOICES	#RESPONSES
Critical	11
Very important	8
Important	5
Not important	0
Uncertain	0

Importance to obtaining funding of centralized computing resources

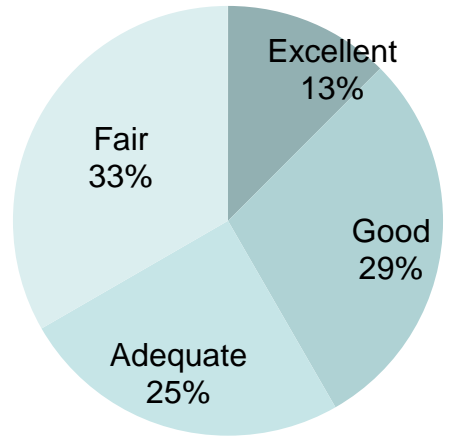


Ratings of NJIT's centralized resources for meeting current needs

Q3: Please rate the NJIT's centralized computing resources for your current computational needs.

CHOICES	#RESPONSES
Excellent	3
Good	7
Adequate	6
Fair	8
Poor	0

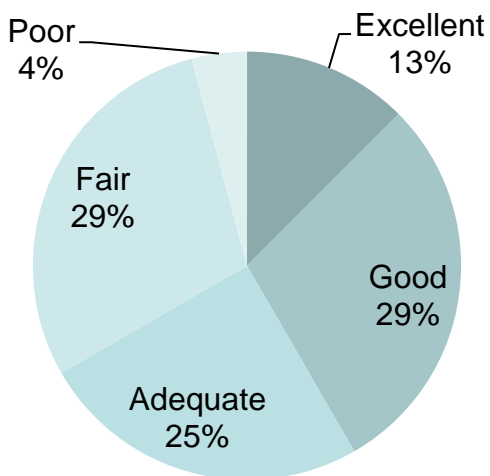
Centralized computing resources:
Current computational needs



Q4: Please rate the NJIT's centralized data storage resources for your current storage needs.

CHOICES	#RESPONSES
Excellent	3
Good	7
Adequate	6
Fair	7
Poor	1

Centralized data storage resources:
Current storage needs



Increasing computational resources

Q5: By what factor, relative to the current resource, should the following computational resources be increased to meet your needs from 2015 to 2020?

Increase number of CPU cores by a factor of:

CHOICES	#RESPONSES
1	0
(other) 4	1
5	7
10	8
(other) 20	1
50	2
100	2
1000	3

Increase RAM per core by a factor of:

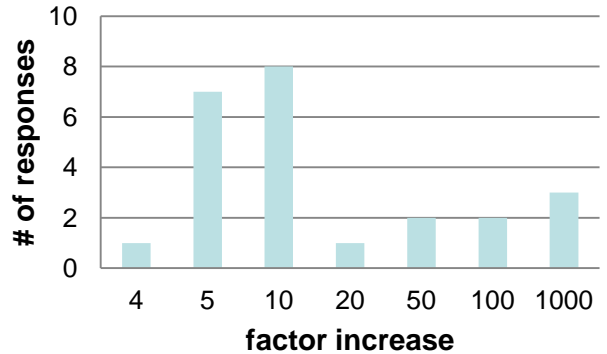
CHOICES	#RESPONSES
1	2
(other) 2	1
5	8
10	7
50	3
100	1
1000	2

Increase number of GPUs by a factor of:

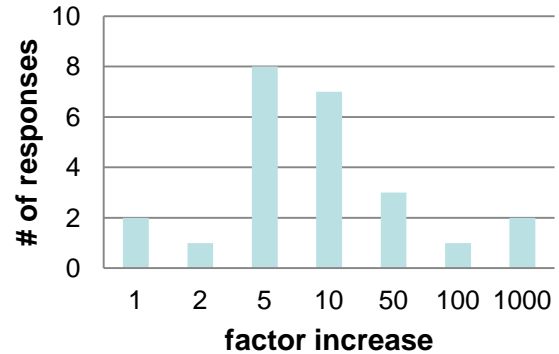
CHOICES	#RESPONSES
1	6
5	5
10	7
50	2
100	1
1000	2

NOTE: 1 participant chose OTHER: n/a
Hence, only 23 numerical responses

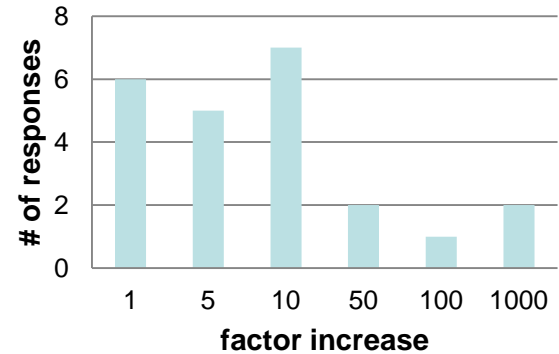
Increase in CPU cores



Increase in RAM per core



Increase in number of GPUs



Increasing storage capacity

Q6: By what factor, relative to the current resource, should storage capacity be increased, for the three storage classes defined below, to meet your needs from 2015 to 2020?

FAST ACCESS: Space used for very temporary storage during computation (scratch space).
Increase storage capacity by a factor of:

CHOICES	#RESPONSES
1	2
5	5
10	6
50	2
100	8
1000	1

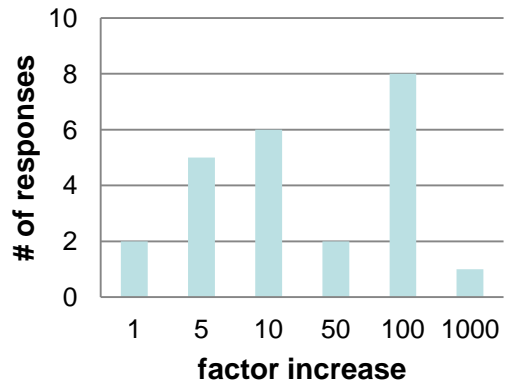
MODERATELY FAST ACCESS: Space used on a regular basis, for reading from and writing to during computations. Typically this space is in home or research directories. This space does not include scratch space. This space is backed up.
Increase storage capacity by a factor of:

CHOICES	#RESPONSES
1	1
5	5
10	6
50	3
100	8
1000	1

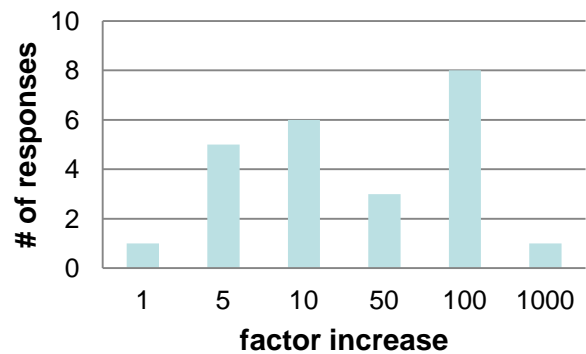
SLOW ACCESS: Archival space. This space is not on-line, but can be made available as needed.
Increase storage capacity by a factor of:

CHOICES	#RESPONSES
1	2
5	7
10	5
50	2
100	7
1000	1

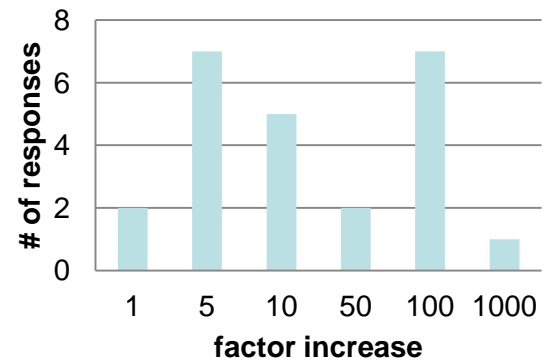
Increase fast access storage



Increase moderately fast access storage



Increase slow access storage



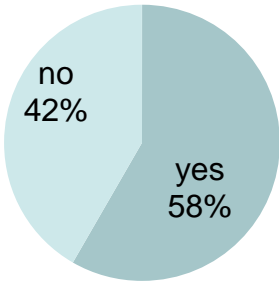
Distributed parallel file system

Q7: Do you anticipate a need for a distributed parallel file system for your computational needs from 2015 to 2020?

Distributed parallel file systems stripe data over multiple servers for high performance, and are most often used for scratch space.

Anticipated need for distributed parallel file system

CHOICES	#RESPONSES
yes	14
no	10

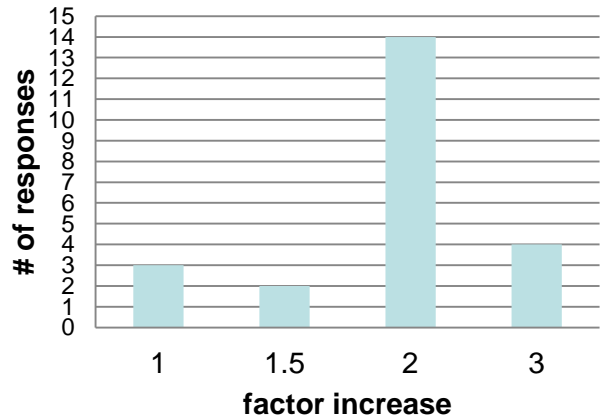


IST ARCS

Q8: Staff support for researchers using NJIT's centralized computing resources is provided by IST ARCS (Academic and Research Computing Systems) (formerly UCS, University Computing Systems). By what factor, relative to the current support level, should ARCS staff resources be increased to meet your anticipated needs from 2015 to 2020?

CHOICES	#RESPONSES
1	3
1.5	2
2	14
3	4

Increase ARCS staff resources



NOTE: 1 participant chose OTHER: "No easy way of judging"
Hence, only 23 numerical responses

Open comments

Q9: Please provide any additional information you think would be useful that expands on information you have already provided and/or covers areas not otherwise covered in this survey.

❖ Documentation of cluster resources has been very spotty, with old sites living long after they're obsolete. A consistent (and, to the extent possible, automated) approach to documentation would be very helpful.

❖ Kong plays a crucial role in research at NJIT. Many parts of Kong are however obsolete and new CPU(s) NEED to be purchased. Proposal writing is critical to obtain new resources and requires putting together a team of PI(s). I believe that someone at NJIT's HPC should become the leader of such a project. For example, [staff member 1] and [staff member 2] have the credentials and respect from the community to put a project like this together. Several PI(s) would be happy to take part in such an important project for NJIT.

Also, in addition to the 50 cores limit, jobs on Kong should not be allowed to run for more than 2 days.

❖ HPC is extremely important for the future research in era of big data.

❖ NJIT has been a prominent player for research and education of emerging information technologies and their applications. For some reason, that strength that is crucial for us lost its top strategic priority in institutional resource allocation. All of us need to put our efforts in a coherent and realistic plan to make NJIT the place for High Performance Computing & Applications. It is very feasible, I think.

continued...

Open comments *continued*

- ❖ We have applied for NSF Grant which has a significant Molecular Modeling/computational chemistry component.
- ❖ Computing services is a crucial component of research at NJIT and is among the great assets of NJIT compared to other universities. This is a great area of strength for us and we should make sure that it remains so.
- ❖ Fast and low latency network accesses
- ❖ NJIT's research computing environment is not at all on a par with research-intensive universities. As such, it is nearly impossible to be competitive in attracting funding. This lack of competitiveness is amplified in the current environment which stresses cyber-infrastructure. Consequently, NJIT cannot possibly realize an increase in funding for computational research without having the minimal resources to match other institutions.
- ❖ The office functions well, but is a little short on manpower. I recommend at least one additional person who is an expert in scientific/numerical computing to help with software (i.e., use, installation etc.) as well as hardware.